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# SCIENCE

NEW YORK, JULY 10, 1891.

## IDEALS OF MEDICAL EDUCATION.<sup>1</sup>

(Continued from p. 4.)

HAVING thus roughly sketched what is wanted in the way of medical education by different classes of students, — the article for which there is a market, — let us next consider briefly what a university may wisely attempt to provide in this direction. Some suggestions on this point may perhaps be obtained from an examination of the condition of affairs as regards medical education in the University of Oxford.

The Corporation of Oxford has a little more than half the number of inhabitants possessed by the city of New Haven, and its relations to London are, in many respects, similar to those of New Haven with the cities of New York and Boston. For a number of years it has been urged by some physicians in England that the University of Oxford, with her great resources, has not been doing as much for medical education as she should have done, and that it is her duty to establish and maintain a completely organized medical school of the usual pattern, using the small local hospital and dispensary facilities for the clinical side of the work.

On the other hand, other physicians, of whom my friend Sir Henry Acland may be taken as the representative, maintain that it is much better that Oxford should use her resources in giving a broad foundation of literary and scientific culture, including, for those who propose to study medicine, the means of special instruction in general biology, and in comparative and human anatomy, physiology, and pathology; and that the men thus prepared should go to the great hospital medical schools of London to obtain their clinical training; after which they may return and pass their final examinations, and obtain the coveted degree of doctor of medicine from the university.

There is no doubt that this can be done, and that a great part of the scientific foundation of a complete medical training can be furnished by a well-equipped university, with little or no reference to clinical instruction at the same time and place. This, for example, is the course followed by many of the students in the medical department of the University of Virginia, and it seems to me that there is also no doubt that the men who go through such a course of training, followed by clinical training in a great city, will have a better course of instruction, a wider experience, and a better chance of seeing and appreciating the methods of great clinical teachers, than would those who obtained their clinical as well as their scientific training in the small town, or than those who obtain all their instruction in a school devoted exclusively to medical studies. Upon this last point I need not dwell, for Dr. Welch, in his address before you in 1888, has clearly pointed out the advantages of giving to a medical school a university atmosphere, and of making the union of the school and the university close and intimate. It should be noted, however, that the more true this is, the more it is the duty of a university to maintain such a school, because edu-

cational work which cannot be, or is not, done so well elsewhere, has superior claims upon university aid. The chief thing which can be said in favor of the attempt to attract a large number of medical students of average qualifications to an institution having the means to give the higher education are, first, that it brings in more money, and second, that it enables those professors who desire advanced workers, to select these from a somewhat wider field.

It must be confessed that nearly all our great American universities are unwilling to apply their funds to the creation and maintenance of a well-equipped medical department. They are willing to have such a department, no doubt, but they want the money for establishing and maintaining it to be provided in addition to money which has been, or is to be, provided for the general purposes of the university. The ideal university culture of the present day appears to be designed to fit a man to take pleasure in his own thoughts and musings, and in mental exercises in languages, literature, the higher mathematics, and the problems of physics and natural history. Incidentally his knowledge of these things may not only give him pleasure, but enable him to help others; but the studies are not to be pursued on account of any practical utility which they possess, but for the love of learning and pure science, that is, for personal gratification of a particular kind. Those who hold these views are apt to consider medicine as a technological matter, which should be left altogether to special schools, because, being practically useful in a commercial sense, the means of teaching it are sure to be provided through commercial interests, just as they are sure to be provided for the teaching of practical engineering. This is far from the old university idea as embodied in the three faculties and four nations of the University of Paris. So far as the interests of the public are concerned, it is only the possession and control of a large amount and variety of clinical material, or of unusually qualified clinical teachers, which makes it the positive duty to use it, or them, for purposes of medical instruction in order to train ordinary general practitioners of medicine. There is no present deficiency in the number of such practitioners, and we certainly have plenty of schools for producing them, so that there is no fear of failure in the supply.

But in medicine, as in every other profession, art, or trade, the supply of the best is never too great, and the demand for something better than that which already exists never ceases.

What, then, does a university, or its medical school, need in order that it may be able to supply the demand for this higher medical education? First, competent teachers; second, suitable buildings, collections, books, and apparatus; third, clinical material. To secure and retain these things requires money, and brains to use it. First, as to the competent teachers. There are many teachers available, but the number of these who have shown that they are competent for, and suited to positions in a medical school which is to supply the best and something better, is limited — much more so than one who has not tried to find them would suppose, and these few are not seeking engagements. How many anatomists, or physiologists, or pathologists, of the

<sup>1</sup> Address delivered before the Medical Faculty of Yale College, June 23, 1891, by John S. Billings, M.D. (Boston Medical and Surgical Journal.)

first class — thoroughly trained, authorities in their special fields, capable of increasing knowledge, and with the peculiar gift of ability to teach — do you suppose there are in this country? It is a liberal estimate to say that a dozen of each have thus far given evidence that they exist. And the great clinical teachers in medicine and surgery, the men who are up to the times in matters of diagnosis, pathology, and therapeutics, and who are also successful teachers both by the spoken and written word, — how many such have we, and especially how many such have we who are not fixed and established, so that they may be induced to go to a school which needs them? Such men are either men of genius — and even this boasted nineteenth century has produced them rarely — or they are men of talent made the most of by unflagging industry with special opportunities, and these are also rare. Yet these are the men whom a great university should seek to obtain and retain for her faculties. To do this, and to get the best work from such men, is by no means a mere matter of salary, although sufficient salaries must be paid. We have also to consider the buildings, collections, books, and apparatus required, and this is largely a question of money. How much money? What would be the cost of establishing and maintaining a first-class medical school in this country at the present time? Let us suppose that one hundred and fifty students are to be provided for, that the course of instruction for those coming with a good high-school education is to occupy four years, and for those coming with the degree of bachelor of arts, and having done at least one year's work in a chemical laboratory and one year's work in a biological laboratory, the course shall occupy three years; that the last year's studies shall be almost exclusively clinical, and that provision is to be made for advanced post-graduate work.

We shall want, then, practical anatomy rooms for fifty students, a physiological laboratory, a pathological laboratory, a pharmacological laboratory, a laboratory of hygiene, and the means of clinical teaching, a library, and a museum. The days have long gone by when one or two amphitheatres or lecture-rooms and a small museum were all the outfit required for medical teaching. The little amphitheatre of the University of Bologna was sufficient for almost every purpose of medical teaching as it was carried on three hundred years ago, but now the lecture-room is the smallest part of the outfit required. In his evidence before the Royal Commission, Professor Lankester stated that to establish such a medical school at Oxford as he thought desirable, about \$225,000 would be required for buildings, in addition to those already existing, and that about \$100,000 a year would be required for running expenses. Professor Billroth estimates that about \$400,000 would be required for buildings for the medical department of a university, exclusive of the buildings for clinical teaching, which he thinks would cost about as much more; and that the annual expense would be about \$105,000. He says that these estimates are based on an average standard of efficiency, not the highest, and concludes by saying; "Let us hope that a rich man may some day give three millions of dollars to found a school to be devoted to medicine and natural science."

Perhaps these figures may seem high to you. Yet building is cheaper and salaries lower in England and in Germany than with us, if only first-class work and first-class men are accepted. To build and equip a laboratory which shall give work-room for seventy-five men, will cost here between \$75,000 and \$100,000. At least four such laboratories are needed by the ideal medical department, besides a

building for general lectures, library, etc., which would cost about \$50,000.

It is, of course, possible to consolidate all these into a single three or four story building, and thus save money, especially in cost of ground, but the results are not so good. I am not speaking now of temporary, makeshift buildings, but of permanent structures, which though plain should not be hideous, and should be thoroughly well built. Where land is abundant and not too dear, it is usually better to construct these laboratories one at a time, and endeavor to secure for each a proper endowment and equipment. The average expenses of each laboratory may be put at \$15,000 per annum. In other words, it requires about \$400,000 to build, equip, and endow a physiological, pathological, or hygienic laboratory such as is suited to the needs of a first-class university in this country. By paring down in various directions, this sum can be reduced to \$300,000, but not lower without seriously impairing the efficiency of the plan. And in all this I have said nothing of the cost of the means for clinical instruction, which should be borne, in part at least, by the school, for the simple reason that only by doing this can the school have that control of hospital appointments which is so necessary for its proper work.

Of course every professor who is skilled and energetic, and who is imbued with the true university spirit, has innumerable wants and suggestions which require money to supply and carry out. He wants the new books and journals relating to his specialty, specimens, apparatus, models, and illustrations; and if he is at the head of one of the laboratories which I have named, the sum of \$15,000 per annum will be required to pay him and his assistants, and to provide for their needs. All this means that the educating of physicians on this plan will cost the medical department between four and five thousand dollars for each graduate. It will receive from them eight hundred to one thousand dollars each, and the balance must be made up from subscriptions, appropriations, or endowments. Practically, endowment is the only resource.

The student himself has to give four or five years' time and labor, and four or five thousand dollars, to obtain his medical education. For some, this expenditure of time and money will be an excellent investment; for others, not, — even if they have enough of both to spare for this purpose. After all, the most that the university can do is to afford opportunities for learning, and a certain kind and amount of stimulus to mental work. The professor may declare that he will teach certain branches; but there are some sent to him for instruction who are not teachable, and the only thing he can do is to return them as little damaged as possible.

The number of men for whom it is specially desirable to provide laboratory and other special facilities for original work in physiology, pathology, pharmacology, and hygiene is limited. There are not a great number of men who have the desire and qualifications necessary for this sort of work, and the number of positions in which they can find remunerative employment in devoting themselves to such investigations is still more limited.

The laboratory facilities in Germany are, as a whole, at present in excess of the number of properly qualified men who can be found to make use of them, although a few are overcrowded.

Advanced work and original investigations cannot, as a rule, be made by undergraduates, if for no other reason than that of lack of time.

Is it advisable that the same medical school shall undertake to furnish such different courses as to provide for all wants — to offer to meet the minimum requirements for the degree of doctor of medicine, as well as the wants of those who demand more advanced and detailed instruction? The answer to this depends largely on the location of the school, and on the means which it can command, especially as regards facilities for hospital and clinical instruction. In any case, its diploma of doctor of medicine should have a uniform value, and if it does undertake the double function, the higher education must be largely post-graduate work. It must also be, to a great extent, a voluntary matter on the part of both schools and students.

As indicated at the beginning, this address is not intended to criticise existing medical institutions, or to give specific advice to any college or university. I have simply tried to formulate roughly what seems to be the present ideal of a course of medical education in the minds of many physicians, and then to show what the carrying out of this ideal involves to the schools and to the students.

I believe in ideals, that is, in their beauty and in their utility when they do not dominate a man so as to make him a visionary, or a dangerous crank or fanatic; but one ideal is often more or less incompatible with another, and all of them must be held subject to the possibilities afforded by surrounding circumstances. But we must not be too sceptical about these possibilities. And we are all directly interested in this matter, every one of us. Every one of this audience will probably see the time when the knowledge and skill of the physician called in to advise in the calamity which has fallen on him or his wife or child will seem to him of vast importance.

Sometimes he can select his physician, often he cannot, but must rely on the first one who can be found. Hence these discussions about medical education, although chiefly carried on by physicians, because they are most familiar with the difficulties of the subject, should be considered by those who are not physicians quite as much as by those who are, or intend to be. It is a dangerous business, however, for a doctor to discuss other doctors in public. He can make more trouble for himself in less time in this way than by almost any other method that I know of. Nevertheless, it is my duty to tell you that there is little probability that the ideal facilities for higher medical education, either here or elsewhere, will be furnished by the doctors themselves. There are several reasons for this, but one is sufficient, and that is, they have not got the money, which I have shown you is necessary to provide and maintain these facilities. Hence, if these ideals are to be realized, the means must be furnished by those who are not members of the medical profession, and it seems to me that this is what will be done.

What is the best way for a university, a real university, to begin this line of work? In most cases I should say by establishing one department at a time on a proper basis. Which departments should be the first to be thus established? Just here is where many of the doctors will begin to differ.

I should say that the first of these departments to be provided for are two which will form the main links in the university bond between the medical and other departments, covering two branches of knowledge which every university graduate should study somewhat, namely, biology and hygiene. For the clergyman, the teacher, the journalist, and the sociologist, systematic instruction in these two branches

is as desirable as it is for the physician; for the lawyer it will be useful; only the philologist would I excuse entirely from these departments.

Of course, in specifying that they are to teach, and to teach undergraduates, I do not mean that teaching is to be their sole function. This is not the modern idea of a scientific department of a true university. It is to increase knowledge as well, to provide for the needs of special investigators and seekers who have obtained their elementary training elsewhere.

Let the plans for such a department be well thought out, the expenses carefully estimated, and then bring the matter to the attention of those who have the means to realize this ideal, and sooner or later it certainly will be realized. I have elsewhere ventured to express my sympathy for two classes of men who have in all ages and in all countries received much disapprobation from philosophers, essayists, and reformers, namely, rich men and those who want to be rich.

So far as the wealthy are concerned, there seem to be a good many of them in these latter days who use their stored force to endow universities and professorships, to build libraries and laboratories, and to such let us give due praise and honor. They may not be scientific men, but they make scientific men possible. The unscientific mind has been defined as one which is willing to accept and give opinions without subjecting them to rigid tests. "This is the kind of mind which most of us share with our neighbors. It is because we give and accept opinions without subjecting them to rigid tests" that the sermons of clergymen, the advice of lawyers, and the prescriptions of physicians have a market value. The unscientific public has its uses, and one of its characteristics is a liking for ideals, some of which it occasionally helps to realize. I can only hope that whenever an American university approves the ideal which I have roughly sketched, this public will see that the means are provided for carrying it out. It may be objected by some that it would be better to help to raise the average standard by endowing chairs in the medical schools in large cities, than to provide special facilities for the use of a limited number. It is quite true that all medical schools should be endowed; and this is coming, for voluntary associations of physicians, who are not a wealthy class, cannot afford to compete with endowed schools when State laws shall come to enforce a high standard of acquirements. Nevertheless, we need universities properly so called, as well as colleges and higher schools, and we need university men in the medical profession as well as elsewhere.

I have no fears as to the creation of a medical aristocracy by giving facilities for higher education to those who have the means to avail themselves of them. It is quite true that only a fraction of those who have the means will use these facilities properly, and that there will be a number who have not the means who would make good use of such facilities if they could get them; but these last will not be helped by the total absence of such facilities for anybody. Let us try to give the best minds a chance to obtain the best training; let us try to discover these best minds wherever they may be, and if their owners have not the means to avail themselves of training, let us try to furnish the means. But to do this, one of the first and most essential steps is to provide somewhere the teachers, and the buildings and apparatus, necessary for giving such instruction, and where is a better place to do this than in connection with a university, or, if you please, in connection with this university?